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ABSTRACT

Information on the peer review process for the evaluation of federal grant proposals is presented to help college grants administrators and faculty develop good proposals. This guidebook provides an overview of the policies and conventions that govern the review and selection of proposals for funding, and details the review procedures of the Department of Education, the National Science Foundation, and the National Endowment for the Humanities. Attention is also directed to the manner in which individuals are selected to participate in the review process either as field readers of proposals or as members of review panels. The evaluation of applications in a federal grants competition may involve internal review, external review, or some combination. Common elements in the review process are: initial screening, technical review, program staff review, agency review and approval, and notification of award or declination. Specific information is provided on the following education grant programs: the Comprehensive Program at the Fund for the Improvement of Postsecondary Education, the Office of Special Education and Rehabilitation Services, and the Higher Education Programs of the Office of Postsecondary Education. A list of references that provide information on the grant programs of the three federal agencies is appended. (SW)

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UNDERSTANDING THE FEDERAL PROPOSAL REVIEW PROCESS

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U.S. DEPARTMENT OF EDUCATION
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PREFACE

In working with state college and university grants administrators and faculty, staff of AASCU's Office of Federal Programs are often asked how the peer review system for the evaluation of federal grant proposals actually works, and how faculty from four-year colleges and universities can participate as reviewers of other proposals within their academic disciplines.

This guide provides an overview of the proposal evaluation process and a closer look at its operation within several grant programs of major interest to four-year institutions. It was prepared by Dr. Jan Cavin of East Tennessee State University under a summer fellowship with AASCU's Office of Federal Programs, which allowed her to gain insights into the day-to-day workings of the process through direct interviews with more than a dozen federal program officers.

We hope that the guide will help both grants administrators and faculty to develop more competitive proposals by understanding who the reviewers will be and what factors they are likely to consider in their evaluations, and that it will also help those interested in serving as readers to become involved in the peer review system.

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THE COMPETITION FOR FEDERAL DOLLARS

When seized with an urge to go beyond the classroom lecture, to probe a new science or illuminate an old one, the college or university faculty member is likely to look first at the federal government for potential funding. Since enactment of the Morrill (1862) and Hatch (1887) Acts, which provided funding for research, training, and demonstration activities in agriculture and vocational education, the federal government has been a major source of support for scholars aspiring to excellence within a given discipline, and to institutions seeking to enhance their missions of education and community service. It provides support for specialized training, demonstration of model techniques and materials, student support services, acquisition of library materials and laboratory equipment, and construction and/or renovation of facilities, and accounts for more than 50 percent of the approximately $30 billion expended annually for research and development activities.

Federal support for higher education research and development has been so consistent and so massive that today many academicians labor under the misconception that the government is in the business of supporting all worthwhile scholarly endeavor. They reason syllogistically that: IF the government supports good research and development in higher education; and IF a scholar or an institution has a good idea for a research or training project; THEN the government should fund said project.

Quite the contrary is true. Despite a history of generous support to higher education, the United States government, through its complex network of agencies, is principally a consumer. In response to perceived societal needs, the government purchases those goods and services that it believes will solve a problem, eliminate a danger, or improve some facet of the American condition. For example, the post-Sputnik response of the federal government to a perceived need for stimulating scientific research and increasing the pool of American scientists was a drastic increase in federal support for research and incentives for talented students to major in science and mathematics. More recent societal concerns have resulted in the allocation

of billions of dollars for research in alternative energy sources and computer technology, as well as massive training programs for teachers of bilingual, handicapped, or retarded children.

Fortunately for higher education, the United States government has long recognized the cost effectiveness of purchasing research and training services from colleges and universities. However, it has finite resources with which to purchase the services that will advance its causes. Virtually any agency spokesperson would agree that the list of good, fundable proposals is always longer than the congressionally allocated budget can reach. Generally speaking, the awarding of funding in a competitive federal grant program is a process of eliminating the poor or weak proposals, ranking the good proposals, and supporting as many of the best proposals as funds will allow.

While competition for federal dollars has always been keen, it has become brutal in recent years. The last decade has seen increasing numbers of scientists (many of whom were trained in federally sponsored programs of the sixties and early seventies) competing for a decreasing pool of constant dollars. Not only are there fewer real dollars due to inflation, but inflated costs of materials, equipment, and manpower mean that an individual proposal will, today, have significantly a higher pricetag than it would have had even two or three years ago. The net result of these factors is a competition for funds that is, at best, intimidating to the new or the less experienced proposal writers.

Writing a proposal that will stand at the top of the list of good proposals in a grants competition is both a science and an art. The science involves precision in following guidelines for the proposal format, and skill in articulating an idea that clearly reflects the applicant's understanding of the agency's mission and the appropriate knowledge and methodology to achieve the goals of the specific competition. The art of writing a successful proposal, however, lies in a more subtle ability to anticipate the concerns of those who will read and evaluate the document. The finesse which lifts a proposal above the many other good submissions to the ranks of the outstanding requires a clear understanding of how and by whom the proposal will be reviewed.

AN OVERVIEW OF THE PROCESS

The fundamental task in reviewing proposals is to choose, from among the many submitted, those offerings that are most likely to produce results of a high caliber. Of considerable importance to the funding agency is its accountability, to Congress and to the public, for the dispensation of public funds. Therefore, a federal agency's selection of one particular form of review over another is often closely aligned with its perception of what set of procedures will ensure its ability to justify its funding decisions.

The first purpose of this report is to provide an overview of the policy and conventions that govern the review and selection of proposals for funding in federal grants competitions. Within this broad context, the discussion will focus in more detail upon the review procedures of three agencies of interest to four-year colleges and universities: the Department of Education, the National Science Foundation, and the National Endowment for the Humanities. A second, and equally important, purpose of the report is to provide insight into the manner in which individuals are selected to participate in the review process either as field readers of proposals or as members of review panels.

The information presented herein has been compiled from a multitude of sources, including program guides, competition announcements, annual reports, testimony and reports to Congress concerning the grants review process, agency priority and policy statements published in the *Federal Register*, published and nonpublished empirical research studies of the review processes in certain agencies, and personal interviews with administrators of selected agencies and programs. A listing of materials that provide further information on the review process is included in the Appendix.

Internal vs. External Review

The evaluation of applications in a federal grants competition may involve internal review, external review, or, more likely, some

combination thereof. In a very few cases, such as the Department of Agriculture's small competitive grants program, external review has been legislatively mandated.

Those agencies or programs that utilize in-house staff members to determine the relative merits of research or training proposals are said to have "internal review." The National Aeronautics and Space Administration (NASA), for instance, fills its program director positions with accomplished professional scientists who administer the spending for research within a given program. In a few cases, these scientists-turned-administrators are responsible for evaluating the technical merit of research proposals.

It has been said that those programs and/or agencies that elect to review proposals internally, such as NASA, have a stronger mission orientation than those that opt for external review. The presumption in such cases is that only the program directors who are close to the internal workings of the agency can adequately judge how a proposed piece of research will fit into the agency's mission. A second rationale sometimes offered in explanation of an agency's election to review proposals internally is that, in agencies that deal with a highly politicized area of science, the need is great to ensure confidentiality of both current and pending research.

For whatever reason an agency adopts an internal review policy, it should be noted that internal review does not reduce the decision process to the judgment of a single individual. Typically, where internal review is the policy, proposals that are recommended for funding by a program director are subsequently reviewed and approved by several levels of administrators prior to their actually receiving funding. At any level in the internal review chain, a reviewer might decide to obtain an outside opinion from scientists in other programs within the same agency or those at another agency or at a university. Scrupulous attention is given, where internal review is used, to eliminating any possibility of conflict of interest.

External review in one form or another is by far the most frequently used means of disbursing congressionally appropriated funds. In external review, proposals are evaluated by scientists or authorities in the field of interest who are not employed by the government funding agency. The rationale behind external review argues that the only way to ensure that public monies are appropriately used to support only the very best and most promising of

projects is to seek evaluation of all proposed projects by leaders within the disciplines to which the various proposals address themselves.

The term "peer review" has become, to most minds, synonymous with external review and the two will be used interchangeably herein. It should be noted, however, that this term does not carry a precise and universally accepted definition. To most academics, for example, the term "peer review" would mean review by scientists or experts who are actively engaged in the field of interest, not employed by a government funding agency, and sufficiently experienced in the type of research or training proposed to be capable of rendering discerning judgments on the relative merits of competitive proposals. There exists, among the various programs and agencies, a rather wide variation in defining what constitutes a jury of one's peers. In some programs, for example, it is customary to use scientist-administrators from another agency or program as peer reviewers, without regard for how recently they have been actively engaged in the field. In other programs a scientist from any related discipline may be used in peer review of a research proposal. A few programs use consumers of the particular research or service as peer reviewers (the parent of a handicapped child, for instance, might serve as a peer reviewer of proposals to train teachers of handicapped children).

Types of External Review

Even among agencies that have elected to use external review, a variety of approaches may be adopted, including the following: (1) mail review; (2) *ad hoc* panel review; (3) review by a standing group of experts; or (4) some combination thereof. For mail review, the program director selects a specified number of qualified reviewers to receive the proposal, along with written guidelines and criteria for evaluating the proposal. Typically, a field reviewer is asked to provide both an objective evaluation in the form of a numerical score or an adjectival rank (poor, good, excellent, etc.) and written comments on the overall quality of the proposal. Programs that rely on mail review rarely send more than one proposal at a time to a reader, although a given reader may be called upon to review several proposals over the course of a year.

Often when a given competition generates a large response, a panel will be convened, *ad hoc*, to review the proposals. Panel mem-

bers, selected by the program staff, will meet for several days to determine the proposals' ranking. In other programs, the panel may require neither a score nor a consensual recommendation for each proposal. Often, in these panels, the group output is in the form of a narrative evaluation that summarizes the "strengths" and "weaknesses" that were individually and collectively noted in each proposal, perhaps along with a headcount of how many panel members voted to fund the proposal and how many indicated otherwise.

Whatever particular set of procedures is followed by an agency or program, it is important to note that the resulting evaluations and recommendations are of varying weight in the overall funding decision. Whereas in some agencies and programs a high score and enthusiastic panel endorsement are tantamount to receiving an award, in other programs the most positive peer evaluations are seen as just another point of view that helps to ensure that the staff member will not overlook any aspect of the proposal in his or her own examination. In many cases, it is felt that the peer review process is capable only of yielding objective appraisals of the technical merit of proposals. In other instances the peer review process is relied upon to provide input concerning the broader issues of societal need and public priorities.

COMMON ELEMENTS IN THE REVIEW PROCESS

Although there is great variation among funding agencies where the proposal review process is concerned, there are some common elements that are worthy of note:

Initial Screening

Most proposals, upon their receipt by an agency, are screened prior to being assigned for any type of merit or technical review. The purpose of this initial screening is to ascertain whether all necessary information has been included, to determine whether the proposal is appropriate to the mission of the agency and/or the objectives of a particular competition, and to specify what areas of expertise reviewers must have in order to adequately evaluate the proposal. The small body of research concerning the reasons underlying rejection of funding proposals bears out the importance of this screening preliminary to the technical review. Several studies have noted that among the most common reason for rejection of a proposal is a mismatch between the purposes of the proposal and the goals of the funding source. While a surprisingly large number of proposals are eliminated from competition at the screening stage, few agencies notify an applicant at the time of such an action. For the most part, applicants receive no word as to the disposition of their proposals until all proposals in the competition have been judged.

Technical Review

As noted above, technical review may be conducted internally or externally, by mail or by panel. At this stage, consideration is given to technical merit and/or the intrinsic value of the proposed activity to the advancement of the field. Some agencies have adopted a two-stage review process in which the comments and recommenda-

tions of external reviewers are forwarded to standing advisory councils that also make recommendations regarding the support or declination of each proposal.

Program Staff Review

After gathering as little or as much extramural advice as may be deemed necessary, the program staff will compile and/or synthesize all inputs, arriving finally at a rank ordering of proposals that the staff believe to represent the priority for funding. The responsible staff member will scrutinize the proposal, at this point, both in terms of its merit and in terms of its budget. It is quite common, at this stage, for the staff member to recommend funding but at a lower level than the proposed budget. It is the prerogative of virtually all program directors to act in opposition to reviewer recommendations, but those whose recommendations are in conflict with reviewers must defend their decision and document it clearly. An observation commonly made by program directors is that on those few occasions when the program director is in conflict with the reviewers, the difference is often one of perspective—what may appear an innovative and novel idea to a reviewer who reads a handful of proposals in a year may not be new at all in the experience of a program director who reads hundreds of proposals annually.

Agency Review and Approval

The recommendations of the program director are forwarded, in some cases through a standing advisory group, to administrators at the division and/or agency levels for final approval. Usually, but not always, the program director will have conducted informal budget negotiations, so that, at the highest levels of agency review, there are not many questions regarding the level of funding and the scope of work to be completed. Top agency officials may read entire proposals, but most often they review the project abstract and budget narrative. The primary aim of this final review is to determine whether the recommendations of the program director are supportable.

Notification of Award or Declination

Upon completion of the agency's review, individual applicants are notified concerning the disposition of their proposals. (Some federal agencies advise appropriate members of Congress of the approval of a project in their area a day or more before notification is sent to the applicant.) Negotiations concerning the budget or the scope of work will be formalized and in writing at this point. Several agencies have a formal appeals policy, which ensures any applicant the opportunity to have his/her proposal evaluated at the highest level of an agency if there is doubt as to the appropriateness of the funding decision. While such challenges are rare, the option provides an extra measure of accountability in the grant–making process.

PROCEDURES IN SELECTED FEDERAL AGENCIES

The external peer review process within individual federal agencies is subject to many procedural variations, which derive from agency policy or convention, from the availability of staff resources, and from the nature and purpose of the particular grant competition. These variations in the way in which proposals are reviewed and selected are significant in determining who will have primary responsibility for the funding decision, and what that individual or group will look for in assessing proposals.

To illustrate some of the major permutations of the proposal review process, this section examines the way in which peer review is handled by three programs within the Department of Education, and by the National Science Foundation and the National Endowment for the Humanities.

Department of Education/Fund for the Improvement of Postsecondary Education (FIPSE)

The Comprehensive Program at the Fund for the Improvement of Postsecondary Education (FIPSE) is exemplary of one Education Department approach to the review process. This program's review is conducted in two stages: (1) a preliminary competition, in which applicants submit five-page summaries of their proposed projects; and (2) a final competition, in which full proposals are invited from those whose proposals were ranked among the top in the preliminary competition.

FIPSE Procedures

In the preliminary stage, 2,000 or so proposals are reviewed by panels of three external readers. Because of the broad scope of topics that may be proposed in this field-initiated program, no attempt is made to match reviewers with the content areas represented in the proposal; rather, proposals are randomly assigned to readers. (Writers would certainly wish to take note of the fact that

their proposals are evaluated by an audience of generalists.) Although reviewers are constituted as panels and the panels do read proposals in a group, there is absolutely no group discussion of proposals. FIPSE staff members want to receive three independent reviews of each proposal, believing that the three differing views will prevent the staff from overlooking any salient elements in the proposals.

Each reviewer will read 50–60 proposals per meeting. This rather heavy load is required both because the program receives so many proposals and because FIPSE staff want their readers to have a broad perspective from which to evaluate the significance of a proposal. The form that FIPSE reviewers use has 12 multiple choice items on the front that are designed to help the reviewer structure his analysis of each proposal. On the reverse side of the review form, the reader is asked to write a narrative statement in which he/she must (1) holistically rate the proposal on a scale of one (low) to seven (high); and (2) describe the proposal's particular strengths and weaknesses, with particular attention to the elements of the proposal, the purposes of the Fund, and the personal experience of the reviewer. It is this narrative statement that is of greatest importance to FIPSE staff.

Staff members consider the purpose of these review panels to be strictly advisory. Every proposal is carefully analyzed by the FIPSE staff, with reviewer comments viewed as valued but not essential to the elimination of inadequate proposals. It is not so rare, in this program, for the staff recommendation to differ sharply from that of external reviewers. The issue that is most likely to be at variance is the relative significance of a proposed project. What may appear to be significant to the reviewer who may read 50–60 proposals per year is sometimes diminished in the estimation of a program officer who reads several hundred proposals annually. Unquestionably, the balance is on the side of the program personnel.

Review of full proposals in FIPSE's Comprehensive Program is identical to the preliminary review process with a few noteworthy embellishments. First, at the final stage, an attempt is made to match reviewer specialties to proposal content. Of the three individuals assigned to review each proposal (two external reviewers and one staff member), at least one will be selected from a field that is at least closely related to the content area of the proposal. Final proposals are also mailed, on occasion, to expert reviewers when technical questions arise.

Program staff typically contact the most competitive applicants, prior to making a recommendation for funding, in order to gather still more information about the project and its proposers. Furthermore, it is not unusual for staff members to contact professionals in the field who can provide feedback concerning the principal investigator or other key project personnel. The agency's presidentially appointed Board of Directors actively reviews final proposals as well. At this stage, the reviewers' comments are seen as input to the staff; staff recommendations provide input to the Board; and the Director has the final approval authority. It must be noted, however, that it would be a rare circumstance should the staff recommendation not be honored.

In selecting individuals to read its proposals, FIPSE staff first determine a site for the meeting and then draw reviewers from within a 50-mile radius of the site. The staff has no systematic procedure for selecting the review sites each year and no criteria beyond the requirement that the meeting location must be fairly well populated academically, since reviewers will be drawn from that area. A particularly good reviewer may be invited to read a second time, but a third invitation is highly unlikely.

Serving as a FIPSE Reviewer

Given this high turnover rate among reviewers, it is not surprising that FIPSE staff welcome inquiries from individuals who wish to be involved in the review process. Resumes may be sent to the agency by any interested individual. Since reviewers often will have to evaluate proposals from very disparate fields, the most desirable reader is one who demonstrates a rather broad background. A potential reviewer must show evidence of keen analytical and written communication skills. Resumes submitted to FIPSE are filed by city, due to the policy of drawing all reviewers from a small geographic area. In addition to names that might enter the reviewer pool through self nomination, staff members actively seek referrals from FIPSE project directors, former field readers, and, in some instances, from college and university administrators. However, the greatest barrier to broad faculty participation in FIPSE reviews is the practice of selecting a single geographic location for proposal evaluations.

Department of Education/Office of Special Education and Rehabilitation Services (OSERS)

In the Education Department's Office of Special Education and Rehabilitation Services (OSERS), the role of the external reviewer weighs more heavily in funding decisions. Proposals submitted to these programs receive at least three individual reviews in addition to the evaluation of an *ad hoc* panel. Individual reviews are completed prior to panel meetings, and include (1) a specific recommendation as to whether a project merits support or not; (2) numerical ratings that reflect the reviewer's judgment of the merits of each application; and (3) detailed documentation of the specific strengths and weaknesses of each application to substantiate the rating.

OSERS Procedures

A review form is used to guide the individual reviewer through the evaluation. This form includes the funding criteria that were published in the *Federal Register* and a strict admonition that the reviewer must not consider any other criteria. Reviewers are similarly encouraged to be precise, specific, and objective in their written comments.

The convened panel that evaluates all proposals is a combination of all the subgroups of three persons who individually reviewed proposals. This larger group discusses each proposal as it is "presented" by the three panel members who reviewed it individually. The panel then assigns a numerical score and a ranking to each proposal.

Panel members are not allowed to change written ratings or comments made prior to the full panel discussions, although a panel member whose view of a proposal alters as a result of group input is allowed to indicate such a revision in his/her thinking so long as such a change is accompanied by an explanation of the major reasons for the alteration. After discussion by the panel, the primary reviewer (one of the three individual reviewers) prepares a summary of panel comments and the resulting score.

Subsequent to this intensive review by peers, the staff computes final rankings based upon the statistical standardization of all scores. Each proposal has four scores, including three from individual reviewers and one from the panel. These four scores are averaged and then converted to standard scores, which form the basis of a ranked list of proposals. From this list, the program officer selects the top

N percent (roughly twice as many proposals as the program has funds to cover) for the thorough scrutiny of the program staff.

Program officer recommendations are based heavily on input from the panel. As a rule, the program officer's funding recommendation will be a question of how far down the list the money can be stretched. In a case where there is discrepancy between individual reviews and the final ranking of a proposal, the program officer looks closely at all documentation in order to verify that the review was appropriate and adequate and that no systematic biases were operating. The program officer forwards to the branch chief a Staff Technical Review Summary for all applications recommended for funding. Particularly careful documentation is required in the event that the program officer recommends an action (to fund or decline) that is not in concert with panel rankings.

At the level of the branch chief, the purpose of the review is to verify that funding recommendations are justifiable on the basis of peer review results. Branch staff inspect the documentation for each proposal to determine the appropriateness and consistency of recommendations. This done, the final list of recommended proposals is submitted to the division director, who considers the overall "spread" of the recommended funding, including such variables as (1) geographic distribution; (2) curriculum content; (3) demographic target; (4) special populations to be served, and the like.

Serving as an OSERS Reviewer

Due to the relatively large number of proposals that the Office of Special Education and Rehabilitation Services considers each year, the staff works continuously to maintain its pool of reviewers. In an effort to update and increase the peer reviewer pool, the agency recently issued an invitation to apply to the pool or (for those already in the pool) to update credentials. This letter went to all reviewers currently on the list, the principal investigators of all currently funded programs, every member of the Council for Exceptional Children, and every organization of parents of children with special needs. The agency is pleased to accept requests to be included in the reviewer pool from any qualified individuals, requiring only that such requests be accompanied by curriculum vitae or resumes. Individuals who have already applied to be reviewers should plan to send updated credentials periodically, since the reviewer files are purged every three years.

OSERS goes to great lengths to protect the integrity of its review process. For example, the reviewer pool is a stratified computer file, that is, names are categorized according to the type of expertise, type of competition, or both. The program officer who is putting together a review panel simply describes to the computer what kinds of experience and/or credentials are required and the computer generates a random list of potential reviewers. Program officers are required to start at the top of the computerized list in inviting individuals to participate, stopping at whatever point yields the desired number of readers. They are not free, as in some other agencies, to select reviewers out of order based upon their personal knowledge or interactions with certain individuals. Furthermore, OSERS program personnel are required to include, in each group of reviewers, at least 10 percent representation from minority groups, 10 percent representation from handicapped groups, and 33 percent reviewers who have not previously reviewed for a competition. No person may review for more than two consecutive years in the same competition.

Department of Education/Office of Postsecondary Education (OPSE)

The Higher Education Programs of the Office of Postsecondary Education (OPSE) illustrate still another version of the Department of Education's review process. In this particular permutation of peer review, external reviewers have maximum impact on the decision to grant or decline funding for a project.

OPSE Procedures

After an initial screening by program staff members (to determine eligibility, appropriateness, and completeness) proposals are usually evaluated by three nonfederally connected reviewers. As in the OSERS sequence, each of these three panel members rates the proposals that have been randomly assigned to him/her independently before meeting for group discussion. Group discussions are expected to arrive at a consensual opinion and must yield a group score. Where a large disparity exists between the scores assigned by individual reviewers, a staff member works with the group to achieve consensus.

The final or group scores, which in this case are not converted to standardized scores, are the basis for ranking all applications. Should two or more proposals emerge from their respective panels with identical scores, the program officer is empowered to break the tie based upon the internal review of applications. A standard tie breaker would be the issue of need, or, in some cases the program director may add up to 15 points to the proposal's average score based upon the prior history and performance of the applicant. Except in cases of tied scores, the raw scores that are assigned during the review process link the proposal to a particular priority rank. For a program officer to diverge from the panel's established rankings would require a Herculean justification effort and, therefore, it is rarely done unless the staff member finds a fatal flaw that escaped all outside reviewers. One example of such a flaw might be a proposal that, upon close scrutiny, requested support for nonallowable activities.

Once the proposals are ranked, program staff negotiate budgetary concerns, unofficially, with those applicants whose priority ratings are highest. At this point, the program officer usually has certain guidelines within which to work; for example, (1) the pro-

ject must maintain a stated ratio of staff to clients; (2) the project may commit no more than X percent of its total budget to the purchase of supplies; or (3) no project budget may increase more than Y percent over previous years' funding levels. Following these negotiations, which are usually conducted by phone, the program officer recommends a certain level of funding for those proposals that are to be supported. This recommendation goes up through the various agency levels to the Secretary of Education, who has the ultimate discretion to deviate from the rankings in order to achieve broader agency goals. (Such an exception to the rankings would be most likely to happen, if at all, within the International Programs, given agency interest in attaining an appropriate geographical distribution of funded projects.)

Serving as a OPSE Reviewer

Another office with a great need for peer reviewers, the Office of Postsecondary Education (OPSE) pursues a policy of "active and continuous recruitment" of field readers. Selection of reviewers is generated randomly by the computer in response to the program officer's request for N number of names with expertise in discipline X and for experience in postsecondary education, and so on. The possibility of being selected to review is increased by the fact that a reader may not be used by a given program for more than two consecutive years and the stipulation that at least one-third of the reviewers used each year must be new to the program. Program officers are also obliged to approach a balance on panels in terms of sex, race, geographical representation, and the type of employing institution.

To be placed in the pool of potential reviewers, an individual need only make a written request to the program officer, forwarding his/her credentials along with the request. Program officers are responsible for evaluating an individual's credentials and placing (or declining to place) that name in the pool. Program officers also solicit recommendations of potential reviewers from current readers. As the existing pool of potential OPSE reviewers is eight to ten years old and due to be purged in the near future of all names of persons who are no longer accessible by mail, interested faculty will want to submit their credentials to Higher Education Programs of the Office of Postsecondary Education in the coming year.

National Science Foundation (NSF)

In 1977, the National Science Board issued a formal resolution requiring external peer review of all proposals for funding with only a few exceptions, such as proposals in response to contract solicitations that are governed by federal procurement regulations. Hence, virtually all of the proposals submitted annually to the National Science Foundation (NSF) are reviewed externally. Mail review has traditionally dominated in the directorates of Mathematical and Physical Sciences (MPS); Engineering (ENG); Scientific, Technological, and International Affairs (STIA); and Astronomical, Atmospheric, Earth, and Ocean Sciences (AAEO). By contrast, the Biological, Behavioral, and Social Sciences (BBS) directorate uses mail review or panels to evaluate its applications, while in the Science and Engineering Education (SES) directorate, the standard is *ad hoc* panel review, supplemented on occasion by mail review.

NSF Procedures

When the mail procedure is employed, the program director, after an initial screening of proposals, mails each application to three to ten individuals whom he or she has identified as experts in the field of inquiry. Along with the proposal, the reviewer receives the Foundation's standardized instructions and reviewing forms. Instructions remind the reader of the criteria to be applied in judging the proposal. Eleven criteria, which are published in NSF's guidelines for grants for scientific and engineering research, advise the reviewers to examine a proposed project in terms of four areas: competence of the principal investigator, content, scientific relevance, and potential impact. The standard review form requires the evaluator to provide both an adjectival evaluation of the overall proposal (poor – excellent) and written specific comments related to the 11 criteria. (Potential applicants should be aware that among these criteria are items dealing with the past performance of the investigator and the ability of his/her institution to support the project. Special care therefore should be given to preparing the vitae of key project personnel, even though this information will be placed in an appendix, and a description of the institution's resources would also be quite in order.)

In those programs that combine mail and panel reviews, the program directors send each proposal (after initial inspection) to both

types of readers. The size of panels, as well as the number of panelists who receive a particular proposal to read, varies among programs, although program officers are required to justify in writing the use of fewer than four reviewers per application. Panels typically meet in Washington three times per year for discussion of every proposal in a competition, in accordance with the standard NSF review form and criteria.

In either case (panel, mail, or a combination of panel and mail review), reviewers are seen as being strictly advisory to the program director. Reviewer ratings and comments are considered as useful guides in the decision-making process, but NSF staff, unlike their counterparts in ED's special education and higher education programs, are not bound by any type of ranking or score generated by reviewers. In practice, several empirical studies of NSF's peer review process have determined that program director's recommendations do tend to be rather closely aligned with reviewers' ratings.

In the final disposition of a proposal, the program director makes one of the following decisions: (1) to fund the project (usually followed by further negotiations that result in a revised budget); (2) to decline a well-rated proposal for lack of funds or to hold it over for later consideration; (3) to decline, but make suggestions for modifications that would make the proposal more acceptable; (4) to decline, but recommend that a totally new proposal be written; or (5) to decline with no recommendation. After this decision is made, it is submitted for review by the section head and the division head, who attempt to ensure that the program director's choices can be defended with available documentation. While a program director may be asked to reconsider (and better document) a decision, there is little doubt anywhere in the Foundation that he/she has the authority to make this decision.

In a further effort at stringent accountability, the program director's recommendation goes to the Action Review Board within that NSF directorate. This board, chaired by the assistant director who heads that directorate or the Deputy Assistant Director of the Foundation, is composed of both scientists and nonscientists within NSF. At its weekly meetings, the board reviews all awards, and any declinations for which the reviews were mixed. The board seeks to validate the integrity of funding decisions, considering whether reviewers were appropriate, whether reviewer comments were given sufficient consideration, whether NSF grant policies were followed,

and whether the titles of proposed research appear to be meaningful to a lay audience as well as to scientists. Except for large-scale proposals ($500,000 or more in a given year or a total greater than $2 million), which are also reviewed by the National Science Board, the Action Review Board and its chair make the final decision on all proposals.

The implementation of a formal appeals procedure for the reconsideration of adverse actions on proposals is another of the Foundation's accountability measures. The appeals policy provides for the reconsideration of a proposal at three levels (the program director, the assistant director heading that specific directorate, and the Deputy Assistant Director of the Foundation). During FY 1983, the foundation had 44 formal appeals (out of approximately 10,000 declinations), which resulted in a single overturned decision.

As a final check against potential breach of ethics or poor judgment in the review process, NSF has initiated an external program oversight system. In this system, programs are reviewed at least once every three years by existing advisory committees, supplemented as necessary by experts. When a program is reviewed, a sample of proposal and grant files is selected and evaluated on the following bases: (1) the adequacy of the reviews; (2) the appropriateness of the reviewers selected; (3) the adequacy of the documentation and justification of the decision to fund or decline; and (4) the overall scientific quality of the projects supported. Given the various quality checks to maintain high levels of quality and documentation in proposal reviews, the judicious applicant would request all reviewers' comments to use as guidelines in preparing a new proposal or resubmitting an unsuccessful one.

One final permutation of the National Science Foundation's review process that is worthy of note is the Research in Undergraduate Institutions (RUI) program. In order to encourage greater research participation from nonresearch institutions, the Foundation has stipulated that proposals to any of NSF's research programs from predominantly undergraduate institutions will be specially reviewed. Within the standard NSF review procedures, RUI establishes different priorities among the evaluation criteria. Less emphasis is placed on the investigator's track record and more consideration is given to the quality of the idea and the potential benefit of the project to the quality of science education within the institution. Applicants who request consideration under RUI should bear in

mind that the quality of the proposal itself, in terms of precision of language, lucidity of thought, etc., will be critical in convincing reviewers that this individual, despite limited research experience, is capable of performing the proposed tasks.

Serving as an NSF Reviewer

Excluding proposals that do not require peer review (continuation grants, contracts, interagency agreements, and no-cost amendments), the Foundation processed 17,858 proposals in fiscal year 1983. A total of 46,717 individual readers were involved in the various processes. The NSF guidelines for the selection of reviewers are designed to ensure the identification of experts who can give program directors the information necessary to make the best possible funding decisions. Per Foundation policy, the optimum characteristics among a given group of mail or panel reviewers are that some reviewers have a special knowledge of the science and engineering subfields involved, that some reviewers have a broader and more generalized knowledge of the science and engineering subfields involved, and that some reviewers have a broad knowledge of the infrastructure of the science and engineering enterprise and its educational activities. Beyond issues of the reviewers' expertise, NSF policy requires that "to the extent possible," any given group of reviewers should reflect a balance among such characteristics as age, geography, type of institution, and underrepresented groups, including women. Individuals to be absolutely eliminated in selecting field readers for a particular proposal include the following: (1) reviewers who would be directly involved in the project; (2) reviewers from the same institution as an applicant (this includes employees of different campuses of a university system); and (3) reviewers who have a familial relationships to the applicant. Program directors are also discouraged from using (1) reviewers who have been involved as a student or graduate advisor to an applicant; (2) reviewers who are known to be close friends or open antagonists; (3) reviewers who have collaborated on research related to the proposal; (4) reviewers who, themselves, have proposals currently under review within the same area of research; and (5) reviewers who have recently suffered an NSF declination, budget reduction, or other adverse action.

Despite this rather formidable body of selection criteria, it is commonly acknowledged among program directors that, at NSF,

reviewer selection is a creative art more than it is a routinized policy. At present there are over 145,000 names in the Foundation's computerized files of potential reviewers. Program directors can submit any desired reviewer characteristic (such as expertise in geophysics), or combination of characteristics (such as expertise in geophysics, female, minority, no previous experience in reviewing NSF proposals) and receive a computerized listing of all of the individuals who meet these requirements. However, a large number of program directors still maintain manual (3 x 5 index card) files. Whether a director starts with a computer-generated or a manually generated list, the selection of reviewers from among the field of potential readers is totally at his/her discretion. Whereas, in some other agencies, program staff are compelled to work in descending order down a list of randomly selected names, there is no such expectation placed upon the NSF program official. Moreover, there is no agency policy on how frequently a reader may be used, although program directors repeatedly observe that they are careful not to overburden a trusted reviewer by calling upon him/her too frequently in the course of a year. Similarly, there is no requirement within NSF that a certain percentage of the reviewers for a given proposal be new reviewers.

As a result of NSF custom regarding the selection of peer reviewers, the new or less experienced researcher might find it far more difficult to participate in the review process. It is possible, although not often effective, to forward one's credentials and a letter of interest to the appropriate program director. (This is most likely to be effective in the Directorate for Science and Engineering Education, which, because it is newly formed, is hard pressed to find enough reviewers for its programs.) Virtually every program director suggests that the best way to become recognized for inclusion into the NSF pool of reviewers is to be active in one's field by publishing in professional journals (*Scientific American* is a frequently cited source), presenting papers at state and especially national professional meetings, getting an NSF grant. One final opportunity might be to make one's interest known to a colleague who *does* read for NSF, as program directors frequently solicit their recommendations for "new" reviewers. Remuneration for proposal reviewers is slight or nonexistent, but in terms of professional development it is an opportunity well worth the effort.

National Endowment for the Humanities (NEH)

The National Endowment for the Humanities awarded 8,854 grants in fiscal year 1983, having evaluated 6,762 applications in a process designed not only to identify proposals of the highest quality but also, according to published regulations, to "ensure that funding decisions are made impartially."

NEH Procedures

While there are several slightly different versions of peer review among the Endowment's six divisions, the following basic procedures for evaluation of applications are much the same for all divisions:

- **Staff Screening**—Grant applications, upon receipt by an NEH division, are reviewed first by program staff to assure that all necessary information has been supplied and that general eligibility requirements have been met. Staff members typically use this review to determine the areas of expertise that will be required of panelists.

- **Panel Review**—All six divisions utilize *ad hoc* panels for review of grant applications. Each panelist is assigned several proposals to read in advance of the panel meeting. For these proposals, the panelist prepares a detailed written evaluation that, combined with the staff member's summary of comments during panel meetings, forms the documentation for the decision to fund or to decline. Panel discussions result in a recommendation that ranges on a four-point scale from "poor" to "superior." No attempt is made to rank proposals, although a caste system does evolve, separating the "best" proposals (all excellent reviews) from those that are "still quite good" (all good reviews except one). Occasionally the panel's recommendation goes beyond the assignment of an adjective. For example, although budget is not considered at the panel level, the group sometimes suggests that an applicant receive not full support, but a lesser amount to allow for the further development of the project. In other cases, the panel might recommend deferral of a proposal pending further information.

- **Review by the National Council on the Humanities**—Following the panel meeting, the program staff members summarize the

panel comments and ratings into a staff recommendation. (As opposed to the autonomous role of the program manager at NSF, the NEH staff role is that of a facilitator—his or her recommendation to higher bodies is expected to support and clarify the panel's views.) When the presidentially appointed Council meets, it splits into a number of subgroups, each of which reviews all of the proposals for a certain program, with particular attention to panel comments, and reports back to the full Council. The Council then consolidates the subgroup reports into a set of funding recommendations to the NEH Chairman for all applications in that session.

The Council's recommendation may differ, albeit infrequently, from that of the panelists. When this happens, it is likely a result of the fact that the two groups are charged with rather disparate functions. While the sole charge of the panel is to evaluate the merits of each individual proposal, the Council is primarily concerned with the priorities, emphases, and overall patterns of NEH funding.

- **Final Action by the NEH Chairman**—Upon consideration of the recommendations and comments of panelists, staff, and the National Council, the Chairman of the Endowment makes all final funding decisions. When the recommendations of these groups and individuals are not consistent, the Chairman determines which course to follow.

One notable exception to the Endowment's overall review policy is the Division of Research Grants, which solicits review by experts, via the mail procedure, prior to the convening of panels. When panels meet, the written evaluation of these expert readers is available to help members sort through such issues as relevance and technical merit. Another special case is the Division of Fellowships and Seminars, where panelists are able to place applicants in simple rank order because each requests support for a similar activity at a fixed dollar level. Some programs, too, call for preliminary proposals prior to submission of full proposals. In contrast to the preliminary round in FIPSE's Comprehensive Program, the Endowment staff tends to review all preliminary proposals in-house, using the process as a vehicle for assisting applicants to clarify their ideas and polish their presentations.

Names of potential panelists and mail reviewers are held in a computerized pool, which currently contains about 20,000 entries. After initial review of the proposals in a competition, the program officer requests a sorting of these names based on the characteristics of the applications to be evaluated. From the computer-generated list of possibilities, the program officer makes the final selection of reviewers.

Throughout all of NEH, there is evidence of a strong commitment to balance in the overall composition of review groups. On a given panel, one might find scholars, teachers, administrators, librarians, curators, or other humanities professionals and representatives of the community at large. Based upon the nature of the competition and its applications, the composition of the review panel will reflect a diversity of opinion and perspective. The National Council is similarly representative of a broad range of professional, geographical, and organizational entities. In developing a proposal to the Endowment, therefore, the writer will want to eliminate jargon and to concentrate on speaking to a wide slice of society.

Serving as an NEH Reviewer

Undoubtedly, the NEH reviewer plays a major role in the agency's funding decisions and enjoys significant interaction with the Endowment staff. Fortunately for the interested scholar, membership on an NEH review panel is not improbable, given the agency's need for 1,000 or so panelists per year and its policy that each new competition have a new panel, composed mostly of new readers.

College and university faculty interested in reviewing applications to the Endowment may send letters of interest to the appropriate program officer, accompanied by a curriculum vita or a resume. In selecting reviewers, NEH staff members look for "thoughtful analysts" and "skillful communicators" who can present cogent arguments in proposal reviews. In fact, some staff members have noted that their primary method for identifying potentially good reviewers is to listen at professional meetings for individuals whose interactions demonstrate their ability to think and speak lucidly. Other program officers have identified reviewers via published articles, professional presentations, and recommendations from known scholars.

BENEFITTING FROM THE PEER REVIEW PROCESS

Understanding the Evaluation Criteria

There are several ways in which a knowledge of the specific review procedures for a given program can help in developing an effective and successful proposal. As the individual responsible for overseeing the review process, the program director can provide a listing of the criteria that will be used by reviewers, as well as a copy of the form that will guide the reviewers in examining proposals. A growing number of programs are now publishing this information as part of the application package; in other cases, however, this information is readily available from the agency staff. It also would be wise to request information concerning priority factors or weighting that may color the reviewers' attitude toward a proposal.

The program director can also tell a prospective applicant whether geographical or other special considerations will be applied at any stage of the review process. If, all else being equal, attempts will be made to ensure broad geographic distribution of funds, the proposal writer might wish to devote some space in the proposal to describing the service area of the sponsoring institution. It might be wise, for example, to emphasize that an institution serves a multistate area, or a densely or uniquely populated region.

Implications of the Type of Review Used

A skillful writer can surmise much about his or her audience by considering the review procedures to be used. For instance, where mail review is used, the readers will most likely be fewer persons of highly specialized knowledge in one or more of the disciplines represented by a given proposal. Hence, the document should address a technically sophisticated reader, paying particular attention to the relationship of the proposed project to previous work and/or current theory in the field. Moreover, the "expert" from the writer's own field is probably going to scrutinize the personnel, facilities, and

evaluation sections with special care. Less experienced applicants, or those whose appointments are with institutions without a strong research emphasis, could, therefore, consider bringing a strong researcher from a well-known laboratory into the proposed effort as a collaborator or consultant.

Knowing that a proposal is to be reviewed by a standing panel composed of individuals whose personal areas of expertise might range rather broadly, the proposal writer would need to take much greater care in communicating the importance, need, and potential benefit to society of the proposed project. A dual, or two-stage, peer review would indicate the necessity of blending a strong overall narrative to educate the generalist reviewer with enough technical detail (perhaps in the form of appendices, tables, etc.) to convince the specialist.

Whatever review method is used, it is important to be aware that there appears to be a law of cumulative effect in the review process, which dictates that each strength or weakness adds to the impact of the next. Thus, if the proposal is excellent in the first few areas of evaluation, the reviewer's perception of the remaining areas will be colored by a positive expectation for that proposal. Conversely, if the proposal is weak on the first few items, these lower ratings will tend to produce a negative reviewer mind set throughout the remainder of the evaluation.

Obtaining Reviewers' Comments

Perhaps the most obvious benefit to be accrued from the review process is the feedback that a proposal writer may receive in the form of reviewers' comments. All applicants, whether successful or unsuccessful in the grants competition, are entitled to receive a debriefing on the strengths and weaknesses of their proposals. The funding agency will send the verbatim comments of reviewers (without, of course, identifying them by name), or a staff summary of the reviewers' reactions. In addition to whatever written reviews may be sent, most program directors will talk personally with applicants, discussing the reasons for a decision to fund or to decline a proposal. Both positive and negative comments can be invaluable aids to proposal development, enabling the writer to strengthen both the content and the format of the proposal.

Because there are always more good ideas than there are dollars, some well-conceived and highly rated projects inevitably will be declined each year. Given good reviewer comments, an applicant would be well advised to resubmit the proposal in the next funding cycle. A number of studies on the efficacy of resubmission show that the odds in favor of being funded increase dramatically when a "good" proposal is resubmitted within the next funding cycle.

Analyzing Funded Proposals

Another aid to the proposal writer, available at the end of the review cycle, is the opportunity to inspect a sampling of funded grants. Federal agencies are required by law to provide copies of successful proposals. These may be obtained routinely by contacting the appropriate program director, who will, in some agencies, mail copies of the top few proposals at no charge, or, in other agencies, charge the requesting institution or individual for duplication and postage. The writer can learn a great deal about the priorities within a given program by examining several of the top-rated proposals in the competition. In addition to information on programmatic priorities, a perusal of several top proposals from a program will also yield valuable insights into the relative weighting of the various review criteria, as well as ideas for effective formatting.

Serving as a Peer Reviewer

Despite the advantages to be gained from participating in the review process, college and university faculty hesitate to become involved, believing that this is a closed society. While there is a certain degree of competitiveness in the selection of peer reviewers, virtually every agency's reviewer pool is open to new membership. Moreover, some programs, such as those of the Directorate for Science and Engineering Education at NSF, are in need of qualified reviewers for newly developing initiatives.

The policy governing selection of reviewers differs from agency to agency, and often among programs within a single agency. In virtually every instance, the most direct and effective way of entering the pool of reviewers is through contact with the program direc-

tor. Program directors have various methods for identifying individuals who would potentially make good reviewers. Most admit to scanning publications in professional journals, noting presenters at professional conferences, and requesting referrals from persons who are currently reviewing for the program or from currently supported principal investigators. Program directors also uniformly assert that they are glad to accept an individual's self-nomination if he/she will submit a vita along with a brief expression of the desire to participate.

Most agencies do purge their reviewer files periodically, often every three years. If, given the luck of the draw, an individual is not called upon to review proposals within two or three years of having forwarded his/her credentials, it is appropriate to try again. In fact, if one's credentials improve through publication, research, and/or presentations, it is perfectly acceptable to update these credentials with a program director annually or as often as significant gains occur.

Participation in the peer review process can be valuable as a vehicle for the professional development of new and experienced scholars alike. Although peer reviewers are minimally compensated (if at all) for their time, participation in the process as a mail or panel reviewer is a growth opportunity that no prudent academician would decline.

Perhaps the most obvious reward for participation is the access that one gains to new trends and innovative ideas in one's field. In reviewing new proposals, a reviewer is bound to be stimulated by the flow of ideas involved. Part of an idea presented in a proposal might be combined with an unfinished notion that the reviewer had already been considering, to form an innovative concept that might, in turn, become the basis of future investigation by the reviewer. For the reviewer who is not a seasoned grants competitor, this exposure to what others in the field are doing might also serve to bolster his/her confidence by confirming that his or her own projects or ideas are no less unique, innovative, or valuable than others that fare well in the competition.

Another boon for the reviewer of proposals is the opportunity to analyze funding requests for the format and stylistic elements that combine effectively to convey the applicant's ideas. The best of concepts can be occluded by imprecise language and the lack of a "reader's path" through the proposal. A reviewer who might

read from half a dozen to several hundred proposals in a year could hardly fail to absorb some good presentation techniques.

Assuming that the reviewer were reading proposals in his/her own professional field, a look at the various vitae and bibliographies that are appended to proposals also could be useful in broadening and bringing up-to-date his or her knowledge of current activity within that discipline. A further incentive for participating in the peer review process is the opportunity to develop contacts within sponsor agencies. The fact that the reviewer becomes known and respected by members of the program staff certainly will not hurt that individual's prospects for future funding.

The value of being known to the program staff is not, however, the most significant factor in the reviewer's interaction with staff members. What is more likely to give an individual reviewer an edge in future competitions is the probability that, through these interactions, he or she will become more familiar with the goals, priorities and perceived mission of that particular funding program. The applicant who best understands how the program or agency views itself and its needs, and how it selects proposals to meet these needs, will inevitably be the most effective and successful applicant.

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Dr. Janis Cavin earned a Doctor of Education degree from New Mexico State University, and has held a variety of teaching and administrative positions in the College of Education at the University of Texas at El Paso. Her professional interests focus on the education of the gifted and talented, an area in which she has published and lectured widely.

Dr. Cavin currently directs the Bureau of Educational Research at East Tennessee State University. In this position, she provides assistance to College of Education faculty in the identification of funding sources and the writing of federal grant proposals.

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National Institutes of Health

The National Institutes of Health (NIH), although not covered in this study, has published many excellent reports on its peer review process. Those interested in learning more about the NIH peer review system will find the following materials helpful:

NIH Public Advisory Groups: Authority, Structure, Functions, Members. NIH Publication No. 84-10, July 1984, (Published semi-annually).

"Peer Review of Research Grant Applications at the National Institutes of Health", Catherine Henley.

"Who Reads Your Project Grant Application at the National Institutes of Health?", George Eaves.

"A Successful Grant Application to the National Institutes of Health", George Eaves, (reprinted from *Grants Magazine).*

Proceedings of the 1983 Meetings of the Chairpersons of NIH Scientific Review Groups.

NIH Peer Review of Research Grant Applications, (Booklet based on set of slides, intended to be handout accompanying presentation).

All of these NIH reports are available from: Office of Grants Inquiries, Division of Research Grants, National Institutes of Health, Bethesda, MD 20205, (301) 496-7441.

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